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CATEGORIES OF KNOWLEDGE IN INNOVATIVE ORGANISATION PROCESSES

Abstract

Economic performance of enterprises is determined by their access to knowledge which is the main source of innovation and technological progress. In microeconomic terms, the guiding idea behind the creation of innovation in an organisation is the knowledge production function. Knowledge is considered a form of innovation capital transformed into innovation results. The main purpose of the article is to present the problems of knowledge in the innovation process of the organisation and its determinants. The study was based on the analysis of Polish and foreign literature, and also own research, using deductive-inductive reasoning. The process of creating new knowledge in organisations occurs as a result of conscious interactions between the social and technological sides. The originality of the newly created knowledge determines the possibilities of innovation and the success is determined by the development of specific relationships between organisations (administrations, regions and businesses).

Keywords: categories of knowledge, innovation capital, innovation results

JEL codes: O30, O31

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Introduction

The economic performance of enterprises determines access to knowledge, which is the main source of innovation and technological progress. Knowledge, as a factor of production, is characterised by certain qualities that influence the process of its creation and absorption to encounter different limitations, both conceptual and methodical. This is due, among other things, to its unrivaled and limited exclusivity in use, which makes it a quasi-public good (Kijek, 2016, p. 5). The first of the indicated features enables its use at a given time (intelligible knowledge) by different organisations, while the increase of its users does not reduce its resource. On the other hand, the second of the mentioned features of knowledge (limited exclusivity) is determined by the type of knowledge and institutional conditions resulting from the property rights. These features of knowledge generate specific implications for modelling the processes of creating and absorbing knowledge embodied in new products and services, and thereby creating the potential for increased revenue from knowledge products (external effects, diffusion).

To this specificity of knowledge, as a factor of production, is directly related the knowledge- and information-based theory of the firm (M. Aoki, I. Nonaka, H. Takeuchi) (Grant, 1996, pp. 109–122). The aforementioned theory of the firm perceives knowledge as a factor in modern manufacturing organisations (economy). The cognitive theory (H. Simon) refers to the limited possibilities of people's rational behaviour (intelligence) (Noga, 2009, pp. 216–217). In turn innovative theories of the firm must also evaluate the creative abilities of the individual human (J. Schumpeter) and the creativity of the organisation, the processes of creation of inventions (J. Schmookler). Then, there is the theory of resources and competences (E. Penrose), which articulates the role of specific assets. This theory demonstrates the consistency (coherence) between the resource (money-supply) and the information-regulating level of the organisation. This group, of 27 theories of the firm that influence the modern understanding of knowledge, includes the theory of the firm determined by intellectual capital (G. Hamel). The most valuable asset in this case is the ability to attract the most specific assets, the ability to acquire them (Noga, 2009, p. 205).

In the literature, there are two approaches to the processes of accumulation and use of knowledge. The first is characterised by a macroeconomic approach and

refers to the theory of endogenous growth (Romer, 1990, pp. 71–102). The second approach, which is of interest to this article, refers to the microeconomic approach (organisations, institutions). In this field, the leading research model explaining the formation of innovation in an organisation is a function of knowledge production.

The theoretical bases of the paradigm of microeconomic knowledge production are found in the works of Z. Griliches (1979, pp. 92–116; 1998), being certain symbiosis relationships (value systems, ways of formulating objectives, changes in the mechanisms of functioning, transformation of legal form). Knowledge is seen as a form of capital transformed into innovative results. Hence, the capital of knowledge, used in innovative processes, is often called innovative capital.

The production of knowledge proposed by Z. Griliches is still being developed, while its most comprehensive modification is the Crepton-Duget-Mairess model, referred to as the CDM model (Griliches, 1998, pp. 115–156). It enables one to consider the complexity of innovation processes, which is reflected in the structure of the model, which includes the three equations seen as the knowledge accumulation equation, the innovation production equation and the equation of innovation effects (Kijek, 2016, p. 26).

The purpose of the article is to present the problems of knowledge in the innovation process of the organisation and its determinants. The study was based on the analysis of domestic and foreign literature, and also own research, using deductive inductive reasoning.

1. Knowledge category as a resource of organisation

The main feature of the contemporary organisation is the phenomenon of re-evaluating the role of individual factors shaping the value of the organisation, and thus the well-being of society. Therefore, one of the main areas of RBT (resource-based theory) has undoubtedly become the internal problems of resource management. The vital issue is to understand that the role of knowledge and innovation is increasing, while the importance of traditional material factors is decreasing. Highly developed countries (organisations) have evolved from a phase of industrial development to a cognitive, knowledge-based and sometimes creative phase, where the main source of value is knowledge and innovation. Contemporary experience of highly developed countries confirms that gaining competitive advantage in organisations that broadly

use knowledge and innovation is a prerequisite for smart, sustainable and balanced development. The vital issue is to understand that **heterogeneous** knowledge is the foundation for building the organisation's potential, and hence its heterogeneity (Janasz, 2013, p. 35).

Enriching knowledge concerning the determinants of innovation and building the innovative capacity of an organisation, and consequently its competitiveness, is a function of created innovation potentials. Rational design, building and management of innovative capacity in changing external circumstances are essential for effective creation and commercial innovation. Researched external conditions, which are a set of various kinds of factors, such as innovation potential, constitute a specific configuration of visible and invisible resources, i.e. they consist of various components, each of which is of particular relevance. However, this level of significance is not uniform, both in terms of the external factors in question and the individual components of the potential. The concept of the innovative potential of the organisation is considered in the organisation's functional-resource plan. The most important part in the search of vital components affecting the creation of innovative potential factors has economic, political, legal, demographic and socio-cultural and international (within the macro-environment) and also sectoral determinants (Zastempowski, 2010, pp. 273–275).

Literature on knowledge, innovation, human and social capital considered in various external and internal aspects, relating to the different groups present in the organisation is very broad and constitutes separate sub-disciplines. One encounters the terminology of knowledge in many disciplines: philosophy, psychology, sociology, economics, organisational and management sciences, computer science. The variety of knowledge definitions found in literature results from different research perspectives of particular disciplines, which entails the ambiguity of interpretation of the concept of knowledge, which would satisfy all researchers.

Knowledge assets in highly developed countries play a fundamental role in development, and the organisation may be viewed as an institution that creates and consumes knowledge. Reflections on knowledge from ancient times followed two main and also complementary trends. The stream of rationalism formulates the thesis that true knowledge has no source in sensual experiences, but in processes that occur in the mind of man. According to this position, knowledge arises through deductive thinking, by referring to the constructs of the mind. As a result, concepts,

laws, and theories are formed, so it has an aprioristic form and does not have to be confirmed by sensory experiments (Plato, Descartes, Democritus, and Leibniz). In turn, the flow of thought, which is called empiricism, represents the thesis that there is no *a priori* knowledge. The followers of empiricism (F. Bacon, J. Locke, and D. Hume) believed that knowledge is acquired through an induced experience, created by sensory inquiry. Rationalism and empiricism are the basic philosophical currents that perceive the essence of human cognition (wider consideration is taken by Mikuła, 2005; Błaszczuk, Brdulak, Guzik, Pawluczuk, 2003).

The category of knowledge is broadly defined in both Polish and foreign literature. Knowledge is not only difficult to define but also to measure and use in economic practice, which results from the complexity of its category and properties. In a knowledge-based organisation, added value is driven by its effective use. A knowledge-based organisation is usually expected to have the following attributes (Malara, 2009, p. 813):

– systemic thinking postulating the creation and use of knowledge by all employees, regardless of their position within the organisational structure,
– pro-innovation activities and the use of projects in implementing changes,
– rational communication and information systems used in the creation, capitalisation and dissemination of new knowledge and skills,
– flexibility in redefining the basis of own business,
– ability to create greater value than produced by other market participants.

Knowledge is considered to be a factor limiting uncertainty and conditioning the ability to respond flexibly to market needs. Knowledge arises in the minds of people, and in the organisation it is manifested in specific behaviour, culture of behaviour, practice of action and standards of conduct. In a report jointly developed by the OECD and the World Bank, knowledge is treated as a core component of a knowledge-based economy that is created, absorbed, communicated and used effectively by business operators (businesses, organisations, individuals, and communities) (Dahlman, Andersson, 2000, pp. 11–12). Most economic theories see in knowledge the general information of individuals, organisations, and societies, systematically formed and developed skills, which leads to the exploitation of emerging opportunities (process approach) (Mikuła, 2001, pp. 61–63; Krupińska, Stoińska, 1996, pp. 20–21). Neoclassical economics, the Austrian School, the theory of enterprise of E.P. Penrose, and the evolutionary technological change model of

Nelson and Winter perceive a significant development factor in knowledge (Nelson, Winter, 1982). In recent years there has been a growing interest in knowledge at the socio-economic level (management instrument, technology management, strategic management, business economics, and organisational theory) (Love, 1999).

From the previous observations, it is clear that the problem of knowledge is related to many complex issues, resulting from the complexity of the content of this category (intellectual capacity, preferred thinking style, psychophysical features of experiencing person, motivation, and environment). The enumeration of the characteristics of the category in question is indicative of the possibility of seeking new solutions (innovations) that may evolve over time (Janasz, 2012, p. 50).

Gaining, sharing and transfer of knowledge are the basic ways to create entrepreneurial creativity and innovation. The essence of knowledge, the complexity of its components and the role in the innovation process require the use of specific tools and procedures, i.e. the transformation of individual knowledge into organisational knowledge and parallel vigilance over the cycles of the process and its effectiveness (Surówka-Marszałek, 2012, p. 304). Knowledge management in innovative activities should be based on the organisation's previous strategy, i.e. waving, flow, rooting, merging and transfer (Surówka-Marszałek, 2012, p. 304; Den Hertog, Huizenga, 2000).

One may assume that "(…) knowledge management is an emerging business process with all aspects of knowledge in the context, including knowledge creation, codification, knowledge sharing and the use of these activities to promote learning and innovation. It includes both technological tools and an organisational routine consisting of multiple components. They include the generation of new knowledge, the acquisition of valuable knowledge from external sources, the use of this knowledge in decision-making processes, the enhancement of production processes, products and/or services with knowledge, encoding information in the form of documents, databases, software, encouraging the development of knowledge and results of knowledge management" (Gupta, Sharma, Hsu, 2004, p. 3). This definition clearly demonstrates the multidimensional nature of the knowledge management process in organisations as well as the ability to undertake various activities.

2. Types of knowledge

I. Nanoka and H. Takeuchi argue that the interactive process of organisational knowledge development and creation, based on specific events, spiritual formation, learning from others, is a source of success for Japanese companies (2000, p. 53). Organisational knowledge development means the ability of the corporation as a whole to develop new knowledge, disseminate this knowledge in enterprises, its materialisation in products and systems (Nanoka, Takeuchi, 2000, p. 53). It is assumed that not only do they process knowledge but also create it, which becomes the main source of their international competitiveness. When considering the category of knowledge, the authors distinguish two basic types of knowledge: explicit knowledge and tacit knowledge. The first type – knowledge expressed in formal language, which can be used in the application of grammatical rules, mathematical formulae and communicated in a simply and formally between individuals. In the Western philosophical tradition this kind of knowledge is considered dominant.

In turn, tacit knowledge is – according to the authors mentioned – more important, but underestimated as the main factor of collective action. Tacit knowledge (personal beliefs, values, attitudes, elusive qualities) is difficult to formalise, but it is a source of competitiveness. The complementarity of explicit and tacit knowledge, and its interactions are the basis for creating knowledge in business entities (Janasz, 2011, pp. 29–30). The fact that this plays an essential role rather than an auxiliary role, gives it not only an individual character, but also a group and organisational character. The creation and acquisition of knowledge takes place at different levels: individual, group and organisational.

As evidenced by previous discussions, many definitions (ways) of understanding knowledge have emerged. According to B. Mikula (2006, p. 106), "knowledge is usually presented as:

- linking information with its understanding,
- mental processing of information, experience and learning,
- the entirety information of a man,
- reflection on the state of reality in the human mind,
- confirmed beliefs".

Knowledge is generated in the minds of people, in the organisation, but is expressed in behaviour, culture, practices, norms, etc. It cannot be discarded in

exchange for money, it cannot be inherited, and everyone must strive to acquire education and competence (Morawski, 2006, p. 18).

The more complex typology of knowledge is formulated by F. Blackler (1995), who distinguishes its five types:

- knowledge appearing in the individual's mind (absorbed knowledge) – expressed in conceptual skills and cognitive abilities, reflects the value of abstract knowledge,
- embodied knowledge – is focused on the action and context. It's character is only partially open, e.g. learning by action, problem solving skills,
- knowledge rooted in the culture (inculcated) – has a social dimension, open to negotiations, associates the elements of socialisation,
- embedded knowledge – is expressed in routine behaviours and processes. This includes resources and relationships between functions, procedures, and technologies. It depends on the ability and organisational competence,
- encoded knowledge – has the form of symbols and signs, including textbooks, electronic media, projects and symbols.

Knowledge is often regarded as one of the most important components of intellectual capital, and even as the only economic resource (others are considered as a complementary factor). The foundations for human capital were created over the years by the representatives of different schools and economic streams in different countries. The literature of this subject is very rich and forms a distinct subsidiary discipline (Domański, 1993; Barney, 1999). The authors of the contemporary concept of human capital are G.S. Becker, T.W. Schultz and J. Mincer. The emergence of a comprehensive concept of human capital dates back to the 1960s. The creators of human capital referred to I. Fisher's theory of capital, which emphasised that all resources can be taken as capital, provided they are used by the operator. According to this position, people are included in the capital, while their skills, knowledge, and vital strength are assumed to be potential sources of future satisfaction or wage benefits (Giegiel, Wildowicz, 2007, p. 60).

T.W. Schultz defined human knowledge and skills by pointing out that individuals consciously invest in themselves in order to obtain more favourable economic results and improve their well-being (1996, p. 30). The author emphasised in parallel that each subject is equipped with specific knowledge, qualifications and abilities, which are considered as factors of production.

The literature of the subject emphasises the role of different aggregates, which are given different positions in the hierarchical structure (Choong, 2008; Urbanek, 2008). Human capital (intellectual) is a category that encompasses a broad spectrum of resources used in the processes of creation, development and implementation of knowledge (social capital, structural capital, relationship capital). Accumulation of all endogenous (variable) factors constituting intellectual capital creates conditions for and leads to the development of a creative and innovative organisation.

3. Institutional and organisational factors for creating and using knowledge

The increasing role of knowledge (human capital) is related to the level of integration of science, technology and education with production and service provision, increasing scientific and technological potential, modern organisations (enterprises), and the intensification of interactions between knowledge, people and the development of various spheres of life (Obrębski, 2002, p. 44). Human knowledge can be used in an enterprise, organisation and in a region under certain conditions (opportunities). The largest resource is generated by scientific research conducted by qualified specialists (scientists). Part of the new knowledge is formed (produced) in the production process. Technical knowledge (construction, technology) is reflected in new products, processes, new organisations and new marketing solutions. However, this requires educated, creatively cooperating teams. It is evident that human capital is very important, but it is not enough to create and use knowledge. Institutional and organisational factors are also needed. The practice of economic life implies that often large human capital resources cannot effectively use knowledge (Marciniak, 2002, pp. 63–65). So it is necessary to be able to recognise and identify its capabilities (Drucker, 1999).

In many years of empirical research, intangible resources such as knowledge, attitudes and motivations in the resource convention of the school of strategic management are distinguished at different stages (Krupski, 2012, pp. 94–95):

– identify the originality of the resource, which is a prerequisite for creating distinctive organisational strategies,
– determine the usefulness of various resources in resource use, and capture opportunities and avoid hazards,

– identify planning period for various resource and market sizes. And on this basis, predictions about the scale of strategic market orientation, as well as the resources of functioning organisations (companies),
– identify the relationships between the preferred strategic orientation, including the resource type and the degree of turbulence of the environment. According to R. Krupski, knowledge and attitudes, behaviours and motivation of employees have different meanings in achieving the strategic advantage of the examined entities (Krupski, 2012, p. 99). Propagation of a knowledge-based economy model creates new development requirements necessary for the activity of knowledge-intensive forms of economic activity (innovative environment, easy accessibility, and high qualitative qualities) (Wosiek, 2012, p. 49).

Knowledge is the new basis of wealth and freedom. So it is necessary to be able to recognise and identify its capabilities (Handy, 1996, pp. 182–183). P.F. Drucker (1999) predicts that knowledge will become the only significant resource for organisations and societies of the future.

Numerous studies confirm that accumulated and reasonably utilised knowledge is becoming a motor factor in the development of intangible investments today, and therefore, complementary to material investment, creates a synergistic effect, i.e. mutually reinforcing (Grudzewski, Hejduk, 2008, p. 24; Bednarczyk, 2011, pp. 150–188).

Knowledge and information, their quality and, therefore, relevance, are important factors in the competitiveness of organisations that are creative, flexible, innovative, and are able to manage these factors creatively and strategically. In a globalising economy and in organisations, much more often the place of long-term competitive advantage will become the process of gaining short-term advantage (Łobejko, 2008, p. 74). This process is followed by new organisational forms of entities such as knowledge-based network companies.

Knowledge creation is the first step in the management process. Each organisation creates its capacity to develop new and useful solutions. There are various types of motivational actions that define anticipated development opportunities, experiments and systematic education. Knowledge creation in a particular organisation can take place as a separate, parallel process, consisting of the anticipated change of constellations of the knowledge of explicit and implicit knowledge of endogenous or exogenous origin.

The basic determinant of the change of constellations of knowledge is the organisation's strategy presenting the general economic orientation, which represents the direction of the dominant entity. This applies especially to the innovation strategy. This general orientation is the main level and direction of the management of the organisation in view of the changes that occur in the environment and in assessing its competitive potential (human, organisational, financial, technical and production capital). The innovation strategy most often involves increasing R&D capacity, developing links and co-operation with external participants, and monitoring the environment in order to gain knowledge and expand vital competences.

The process of creating new knowledge in organisations occurs as a result of conscious interactions between the social and technical sides. The originality of the newly created knowledge determines the possibilities of innovation. Imaginative thinking, which is a form of holistic thinking, favours both original solutions and innovations. Imaginative thinking facilitates creativity, innovation, cautiously approaching facts and information, and facilitates risk-taking. Creative thinking and innovative approach are used to generate a variety of possible solutions. At this stage of the process the evaluation of proposed proposals is avoided in order not to inhibit the creative process.

Summary

The new development paradigm forces changes in relations between organisations, local governments, non-business institutions and the government. One of the main roles of public administration in the 21st century should be the focus on the strategic objectives and challenges that result from the global economy. The objective will certainly be to create conditions conducive to raising the level of innovation of organisations (businesses), regions and the country. It is widely recognised that civilisational and socio-economic success will be achieved by those communities, states, regions and organisations that will educate and liberate the endogenous ability to generate creativity and innovation (creative knowledge, intellectual capital).

The great potential of the organisation and the high level of education play an important role, but not enough to generate innovation. Success is determined by the development of specific relationships between organisations (administrations, regions and businesses). Often, these relationships are to be informally significant, networked rather than hierarchical, and result from cooperation rather than competition.

All the different strategic objectives, programmed in the EU or in the country, should be characterised by a limited number of measurable objectives and be included in the guiding theme. The aim is smart, sustainable development, which should encourage social inclusion. The trajectory (path) of sustainable development requires specific determinants of entrepreneurship, creativity, innovation, financial resources, consumer preferences and the opportunities that shape the market.

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KATEGORIE WIEDZY W PROCESACH INNOWACYJNYCH ORGANIZACJI

Streszczenie

O wynikach ekonomicznych przedsiębiorstw decyduje dostęp do wiedzy, która stanowi podstawowe źródło innowacji i postępu technicznego. W płaszczyźnie mikroekonomicznej wiodącym myśleniem wyjaśniającym powstawanie innowacji w organizacji jest funkcja produkcji wiedzy. Wiedzę postrzega się jako formę kapitału innowacyjnego transformowaną na wyniki innowacyjne. Głównym celem artykułu jest przedstawienie problematyki

wiedzy w procesie innowacyjnym organizacji oraz determinant ją kształtujących. Opracowanie powstało na podstawie analizy literatury krajowej i zagranicznej, a także badań własnych, z wykorzystaniem wnioskowania dedukcyjnego-indukcyjnego. Proces tworzenia nowej wiedzy w organizacjach odbywa się w wyniku świadomych interakcji między stroną społeczną i techniczną. Oryginalność nowo wytwarzanej wiedzy decyduje o możliwościach tworzenia innowacji a o sukcesach – powstawanie specyficznych więzi między poszczególnymi organizacjami (administracją, regionami i przedsiębiorstwami).

Słowa kluczowe: kategorie wiedzy, kapitał innowacyjny, wyniki innowacyjne